

A NEW VARIETY OF *DECLIEUXIA CACUMINIS* (RUBIACEAE)
FROM THE STATE OF TOCANTINS, BRAZIL, AND A
REVIEW OF THE VARIETIES RECOGNIZED IN THE SPECIES

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ABSTRACT

A new variety of *Declieuxia cacuminis* Müll. Arg. is described and illustrated, *D. cacuminis* var. *tocantinensis* Delprete & J.H. Kirkbr. The new variety is endemic to the Brazilian state of Tocantins, and has been reported from *cerrado* vegetation in the southeastern corner of the state. A key is provided to distinguish the varieties now recognized.

KEY WORDS: *Declieuxia*, *Declieuxia cacuminis* var. *tocantinensis*, Rubiaceae, Tocantins, Brazil, Neotropics

RESUMO

Uma variedade nova de *Declieuxia cacuminis* Müll. Arg. é descrita e ilustrada, *D. cacuminis* var. *tocantinensis* Delprete & J.H. Kirkbr. A variedade nova é endêmica do estado brasileiro de Tocantins e foi encontrada na vegetação de Cerrado na região sudeste do estado. É fornecida uma chave para distinguir as variedades agora reconhecidas.

PALAVRAS CHAVE: *Declieuxia*, *Declieuxia cacuminis* var. *tocantinensis*, Rubiaceae, Tocantins, Brasil, Neotrópicos

INTRODUCTION

Kirkbride (1976) revised the genus *Declieuxia* Kunth, and recognized 27 species and seven varieties in three species: *D. deltoidea* Müll. Arg. with two varieties, *D. cacuminis* Müll. Arg. with two varieties, and *D. cordigera* Mart. & Zucc. ex Schult. & Schult. f. with three varieties. A few years later (Kirkbride 1983), he added a third variety for *D. cacuminis*, *D. cacuminis* var. *decumbens* J.H. Kirkbr. With this, the known range of *D. cacuminis* was expanded from central Minas Gerais to south central Bahia. In 1997, another species was added to the genus, *D. decumbens* J.H. Kirkbr. (Kirkbride 1997), increasing the number of species to 28.

The Rubiaceae were treated for the *Flora dos Estados de Goiás e Tocantins* by Delprete (2010). The Distrito Federal, which is surrounded by the state of Goiás and only touches the state of Minas Gerais on its southeastern corner, was also covered by the treatment. Delprete found nine species of *Declieuxia* in the state of Goiás, six in the Distrito Federal, and just one, *D. fruticosa* (Willd. ex Roem. & Schult.) Kuntze (the most widespread of the genus), in the state of Tocantins. Early in 2012, while finalizing a treatment of the Rubiaceae for the *Flora do Distrito Federal, Brasil*, Delprete encountered a specimen of *Declieuxia* from the state of Tocantins in the herbarium of the Reserva Ecológica do Instituto Brasileiro de Geografia e Estatística (IBGE) in Brasília, that attracted his attention. Since he had reported just a single species of *Declieuxia* from the state of Tocantins, he immediately knew that the specimen represented a new taxon for this state, and possibly a new taxon for science. He consulted Kirkbride about the identity of the specimen, who in turn compared it with the *Declieuxia* specimens in the herbaria of the Smithsonian Institution (US) and New York Botanical Garden (NY). They concluded that the specimen is a member of *D. cacuminis* and is a fourth, new variety of the species, which is described and illustrated below. In addition, a key to the four varieties of *D. cacuminis*, short descriptions, and selected specimens for each variety, are also presented.

SYSTEMATIC TREATMENT

Declieuxia cacuminis Müll. Arg., Flora 59(28):438. 1876.

Shrubs or **subshrubs** 15–150 cm tall, obconical or globose, with erect or spreading ramose branches, glabrous or puberulous; **branches** glabrate to puberulous or sparsely so. Internodes 0.1–2.7(–4.7) cm long. **Stipules** puberulous to glabrate, decurrent or not; stipular appendages 1 or 3 of unequal length, linear-subulate or linear to narrowly oblong, acute at apex, 0.1–4 mm long, the laterals when present half as long as the central lobe. **Leaves** opposite, petiolate, with or rarely without fascicles or a pair of smaller leaves in the axils, 1–2 pairs; petioles 0.5–6 mm long, puberulous; blades plane, broadly elliptic to elliptic to narrowly elliptic or ovate to narrowly ovate, attenuate to shortly so at base, obtuse to broadly acute to acute at apex, 3.2–25 × (1.2–)1.8–11 mm, 1.3–4 times longer than wide, chartaceous, asperous to puberulous above, glabrous to sparsely puberulous below; midrib prominulous above, prominent beneath; venation pinnate, secondary veins (1–)2–4 on each side, arcuate, anastomising, plane to faintly prominulous above, sulcate beneath; tertiary venation obscure. **Inflorescences** modified cymose, terminal at apical node, sessile or pedunculate, 0.8–2 × 0.4–2.4 cm, 6–48-flowered, with 1–4 branches, with the branches 1.6–12 mm long, puberulous to sparsely so. Peduncles 2–7.5 mm long, sparsely puberulous. **Dichasial** or **larger bracts** at the apex of the peduncle 2, linear to narrowly oblong or narrowly elliptic to narrowly obovate, acute to narrowly acute or obtuse at apex, 1–5 × 0.1–0.6(–2) mm, glabrous or glabrate to puberulous, eciliate or sometimes ciliate. **Flowers** heterostylous, some solitary or paired flowers subtended by 2 bracts, subpedicellate; pedicels 0.1–0.7 mm long, glabrous to glabrate; dichasial bracts linear to narrowly oblong to narrowly elliptic to narrowly obovate, acute to narrowly acute or obtuse at apex, 1–5 × 0.1–0.6 mm, glabrous or glabrate to sparsely puberulous, eciliate or sometimes ciliate. **Hypanthium** transversely elliptic to broadly elliptic in outline, 0.3–1.2 × 0.5–1.7 mm, densely puberulous. **Calyx lobes** 4, oblong to narrowly oblong, triangular to narrowly triangular, or ovate, obtuse or acute at apex, 0.2–0.6 × 0.1–0.2 mm, eciliate or sometimes ciliate. **Corollas** pale blue or white; tube 2.5–4.3 mm long, 0.9–2 mm in diam. at orifice, 0.4–0.7 mm in diam. at base, sparsely puberulous or glabrous externally; lobes ovate or oblong, narrowly acute to acute to broadly acute at apex, 1.1–3 × 0.3–2 mm, sparsely puberulous or glabrous outside. **Filaments** 0.2–0.4 or 1–1.4 mm long, sparsely, short puberulous to glabrate or glabrous; anthers 0.7–1.3 mm long. **Styles** 2–2.8 or 4–4.5 mm long, glabrous or sparsely granulate. **Ovule** 1 per locule. **Fruits** with pedicel 0.2–0.5 mm long, glabrous or glabrate; apical emargination 0–1 mm deep. **Mericarps** elliptic, circular to broadly elliptic in outline, 1.2–2.6 × 0.8–2.2 mm, 0.2–0.9 mm thick, sparsely puberulous, smooth.

Distribution.—Brazilian states of Minas Gerais, Bahia, and Tocantins (Fig. 1).

KEY TO THE VARIETIES OF *DECLIEUXIA CACUMINIS*

1. Fruit with the apical emargination 0.5–1 mm deep; mericarps 0.8–1.1 or 1.6–1.8 mm wide; states of Bahia and Minas Gerais.
 2. Stipules not decurrent; mericarps 2.2–2.6 × 1.6–1.8 mm, 0.7–0.9 mm thick; state of Minas Gerais _____ **cacuminis** var. **cacuminis**
 2. Stipules decurrent; mericarps 1.5–2.1 × 0.8–1.1 mm, 0.2–0.4 mm thick; states of Bahia and Minas Gerais _____ **cacuminis** var. **decurrentis**
1. Fruit with the apical emargination 0–0.4 mm deep; mericarps 1.2–1.5 or 2–2.2 mm wide; states of Bahia and Tocantins.
 3. Plants glabrous; stipular appendages 3; leaves with fascicles or a pair of smaller leaves in the axil; corolla tube 3–4.3 mm long, lobes 1.3–3 × 0.7–2 mm; anthers 0.8–1.3 mm long; mericarps elliptic to broadly elliptic, 2–2.4 × 2–2.2 mm, ca. 0.6 mm thick; state of Bahia _____ **cacuminis** var. **glabra**
 3. Plants puberulous; stipular appendages 1 or 3; leaves without fascicles or a pair of smaller leaves in the axil; corolla tube 2.5–2.7 mm long, lobes 1–1.3 × 0.3–0.4 mm; anthers ca. 0.7 mm long; mericarps circular to sub circular, 1.2–1.5 × 1.2–1.5 mm, 0.2–0.5 mm thick; state of Tocantins _____ **cacuminis** var. **tocantinensis**

Declieuxia cacuminis var. **cacuminis**, Mem. New York Bot. Gard. 28(4):72. 1976. *Declieuxia cacuminis* Müll. Arg., Flora 59(28):438. 1876. TYPE: BRAZIL. MINAS GERAIS: "Sumo Brasiliae monte Itambé," 1818, C.F.P. von Martius s.n. (HOLOTYPE: M, fragment G).

Plants puberulous, except the calyx and sometimes the corolla glabrous. **Stipules** not decurrent. **Stipular appendages** 1 or 3. **Leaves** with fascicles or a pair of smaller leaves in the axil. **Fruits** with apical emargination 0.5–1 mm deep. **Mericarps** 2.2–2.6 × 1.6–1.8 mm, 0.7–0.9 mm thick.



FIG. 1. The distribution of the Brazilian endemic *Declieuxia cacuminis* Müll. Arg. and its four varieties, *D. cacuminis* var. *cacuminis*, var. *decurrens* J.H. Kirkbr., var. *glabra* J.H. Kirkbr., and var. *tocantinensis* Delprete & J.H. Kirkbr., in the Brazilian states of Bahia, Minas Gerais, and Tocantins. DF = Distrito Federal.

Distribution.—Endemic to *campo rupestre* (rocky outcrops) vegetation, with white-sand soils, above the tree line on Pico de Itambé in the Brazilian state of Minas Gerais (Fig. 1).

Additional specimens examined: **BRAZIL. Minas Gerais:** Serra do Espinhaço, eastern slope of Pico do Itambé, first large sand stone outcrop below the summit, 11 Feb 1972, W.R. Anderson *et al.* 35833 (BR, C, F, G, K, LIL, NY, RB, UB, US); Serra do Espinhaço, eastern slope of Pico do Itambé, 1310 m, 13 Feb 1972, W.R. Anderson *et al.* 35899 (COL, F, LE, LIL, NY, UB, US); Mun. Serro, alto do Pico do Itambé, 6 May 1942, M. Magalhães 1804 (US).

Declieuxia cacuminis var. *decurrens* J.H. Kirkbr., Mem. New York Bot. Gard. 28(4):72. 1976. TYPE: BRAZIL. MINAS

GERAIS: ca. 8 km W of Grão Mogol, 950 m, 16 Feb 1969, H.S. Irwin, R. Reis dos Santos, R. Souza & S.F. Fonsêca 23348 (HOLOTYPE: UB; ISOTYPES: F, G, K, NY, RB, UB, US).

Plants puberulous, except the calyx and sometimes the corolla glabrous. **Stipules** decurrent. **Stipular appendages** 1 or 3. **Leaves** with fascicles or a pair of smaller leaves in the axil. **Fruits** with the apical emargination 0.5–1 mm deep. **Mericarps** 1.5–2.1 × 0.8–1.1 mm, 0.2–0.4 mm thick.

Distribution.—*Declieuxia cacuminis* var. *decurrens* is the most widespread variety of the species. It is found in the northernmost reaches of the Serra da Espinhaço in the Brazilian state of Minas Gerais and across the Chapada de Diamantina in the Brazilian state of Bahia (Fig. 1). All four localities are at medium to higher elevations (740–1300 m) in zones of *campo rupestre* vegetation on white-sand soils.

Additional specimens examined: **BRAZIL. Bahia:** Chapada Diamantina, Piatã, caminho para Três Morros, Ponto 01, campos gerias, 13°4'25"S, 41°47'51"W, 1300 m, 2 May 2009, M.L. Guedes et al. 15087 (ALCB, US); Serra Geral de Caitité, ca. 1.5 km S of Brejinhos das Ametistas, 11 Apr 1980, R.M. Harley et al. 21216 (K, NY, US); Ibiquara, 25 km N de Barra da estiva, estrada nova para Mucugê, 1100 m, 20 Nov 1988, R.M. Harley et al. 26965 (K, US); Mun. Grão Mogol, Rio Itacambiruçu, 21 Apr 1978, G. Hatschbach 41264 (MBM, NY, US); Mun. Oliveira dos Brejinhos, Estrada Canabrava a Chapadão de Cima, próximo ao alto da Serra Geral, 16 Mar 1998, G. Hatschbach et al. 67811 (MBM, US). **Minas Gerais:** Grão Mogol, 24 Jul 1978, G. Hatschbach 41534 (MBM, US); ca. 8 km W of Grão Mogol, 950 m, 16 Feb 1969, H.S. Irwin et al. 23348 (K, NY, US); ca. 15 km W of Grão Mogol, 950 m, 19 Feb 1969, H.S. Irwin et al. 23539 (paratypes BR, C, F, LE, LIL, NY, UB, US); Serra de Grão Mogol, Pagão, 1000 m, 12 Nov 1938, F. Markgraf et al. 3479 (paratypes F, RB); Grão Mogol, Córrego Escurinha, 740 m, 23 Jul 1986, D.C. Zappi et al. CFCR9855 (NY).

Declieuxia cacuminis var. **glabra** J.H. Kirkbr., Ann. Missouri Bot. Gard. 70:204. 1983. TYPE: BRAZIL. BAHIA: Serra das Almas, middle and upper NE slopes of Pico das Almas, ca. 25 km WNW of the Vila do Rio de Contas, ca. 41°57'W, 13°33'S, 1600–1850 m, 19 Mar 1977, R.M. Harley, S.J. Mayo, R.M. Storr, T.S. Santos & R.S. Pinheiro 19691 (HOLOTYPE: UB; ISOTYPES: CEPEC, K, NY, US).

Plants glabrous. **Stipules** decurrent. **Stipular appendages** 3. **Leaves** with fascicles or a pair of smaller leaves in the axil. **Fruits** with the apical emargination 0–0.4 mm deep. **Mericarps** 2.2–2.4 × 2–2.2 mm, ca. 0.6 mm thick.

Distribution.—This variety is known only from the center of the Chapada de Diamantina in the Brazilian state of Bahia. It is also found at higher elevations in *campo rupestre* vegetation. Even though plants of this variety and those of *Declieuxia cacuminis* var. *decurrens* are found in central Bahia, the two varieties are allopatric.

Additional specimens examined: **BRAZIL. Bahia:** Abaíra, Catolés de Cima, Serra do Rei, subida pelo Tijuquinho, 16 Nov 1992, W. Ganev 1458 (K); Mun. Rio das Contas, Pico das Almas, 20 Feb 1987, R.M. Harley et al. 24457 (K); Mun. Rio das Contas, Pico das Almas, vertente leste, subida do pico do Campo do Queiroz, 16 Nov 1988, R.M. Harley et al. 26174 (K, US).

Declieuxia cacuminis var. **tocantinensis** Delprete & J.H. Kirkbr., var. nov. (**Fig. 2**). TYPE: BRAZIL. TOCANTINS. Mun. Porto Alegre do Tocantins, bacia do Rio Tocantins, sub-bacia do Rio Balsas (T-9, 9 Km da área 3, Ponto 20), estrada para Ponte Alta, entrada após Cachoeira da Fumaça, 546 m, 11°05'26"S, 46°52'00"W, solo argilo-arenoso-avermelhado, quartzo, afloramento calcário, relevo plano a ondulado (morro), campo sujo/cerrado ralo (savana gramíneo-lenhosa), cerrado sobre o morro, 4 Jul 2009, M.L. Fonseca, F.C.A. Oliveira, A.P. Silva Filho & V.C. Oliveira 6086 (holotype: IBGE; isotypes: HUTO-n.v., HUVA-n.v., RB-n.v.).

Subfrutex puberulus, stipulis decurrentibus, trilobis sed unilobis, folii axillis sine foliis parvis in fasciculis vel paribus, corollae tubo 2.5–2.7 mm longo, corollae lobis 1–1.3 × 0.3–0.4 mm, fructibus apicis incisura 0.2–0.4 mm, mericarpiis circularibus vel subcircularibus, 1.2–1.5 × 1.2–1.5 mm, 0.2–0.5 mm crassis.

Plants puberulous. **Stipules** decurrent. **Stipular appendages** 1 or 3. **Leaves** without fascicles or a pair of smaller leaves in the axil. **Corolla** with tube 2.5–2.7 mm long, with lobes 1–1.3 × 0.3–0.4 mm. **Anthers** ca. 0.7 mm long. **Fruits** with the apical emargination 0.2–0.4 mm deep. **Mericarps** circular or sub circular, 1.2–1.5 × 1.2–1.5 mm, 0.2–0.5 mm thick.

Comments.—The flowers and fruits of *Declieuxia cacuminis* var. *tocantinensis* are appreciably smaller than those of the other three varieties; additional characters that can be used to distinguish this variety from the other varieties of this species, can be found in the key provided above.

Distribution.—The other three varieties of *Declieuxia cacuminis* occur at higher elevations in *campo rupestre* vegetation on mountains in Minas Gerais and plateaus in Bahia, east of the Rio São Francisco. *Declieuxia cacuminis* var. *tocantinensis*, however, has a different distribution and ecology. It is found in the Brazilian state

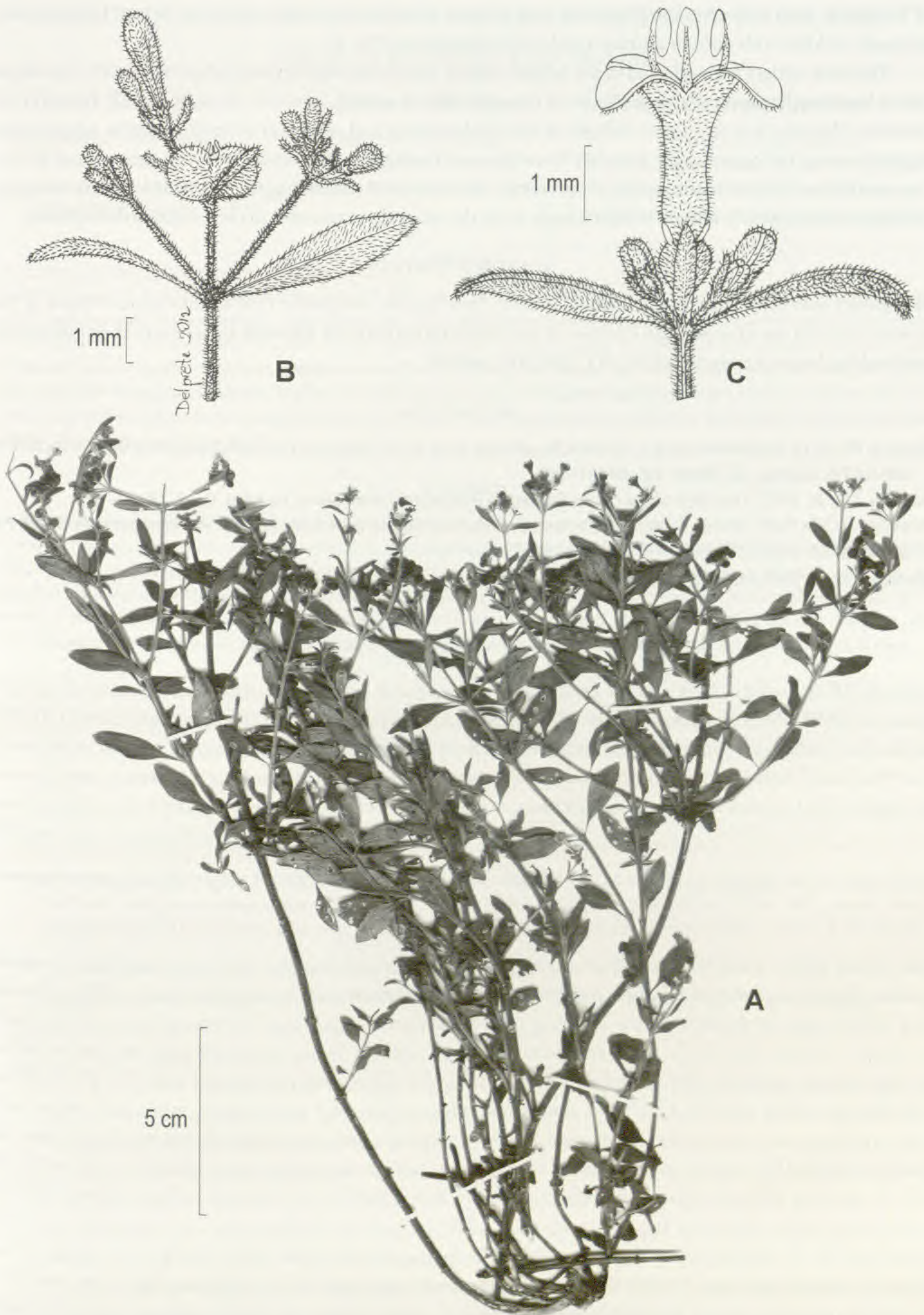


FIG. 2. *Declieuxia cacuminis* Müll. Arg. var. *tocantinensis* Delprete & J.H. Kirkbr. A. Habit. B. Inflorescence with flower buds and young fruit. C. Inflorescence branch with flower buds and a flower in anthesis (all from holotype, *M.L. Fonseca et al.* 6086).

of Tocantins, west of the Rio São Francisco, and at lower elevation in *cerrado* vegetation (a type of savannah), on sandy, reddish soils poor in nutrients and rich in aluminum (Fig. 1).

This new variety was collected in the Jalapão region, which has large areas of white-sand soils. The elevation is lower with respect to the elevations of the other three varieties; however, the type locality is not on the Brazilian Planalto. It is on a lower plateau, at the northernmost end of the Serra Geral de Goiás, which is the divide between the basins of the Rios São Francisco and Tocantins at the border between the states of Tocantins and Bahia. Relative to the nearby river valleys, this area is 50–100 m higher, so the new variety occurs at the highest elevations in its area of distribution as do the other three varieties in their areas of distribution.

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